Answer all questions completely and show all work for calculations.

- 1. List the components of the electromagnetic spectrum in order of increasing wavelength. Come up with a mnemonic device to remember these in order.
- 2. What is the wavelength, in nanometers, of a light wave with a frequency of  $4.84 \times 10^{14} \text{Hz}$ ? What color of light is this?  $(1 \text{ m} = 1 \times 10^9 \text{nm})$
- 3. What is the frequency of an x-ray with a wavelength of 10 nm? (1 m =  $1 \times 10^9 \text{nm}$ )
- 4. What is the wavelength of a radio wave if the station is 104.5? ( $1MHz = 1x10^6Hz$ )
- 5. What is the frequency of an infrared (IR) wave if its wavelength is 0.55mm? (1000mm = 1m)
- 6. The frequency listed on the back of a microwave oven is 2450MHz. What is the wavelength of microwaves coming from this microwave oven?  $(1MHz = 1x10^6Hz)$
- 7. What happens to the wavelength of electromagnetic waves as their frequency increases? What happens to their speed? What happens to their energy? (Assume they are traveling in a vacuum)
- 8. Compare and contrast the wavelength, frequency, and amplitude of wave A and B. How do these waves compare/contrast in terms of speed, brightness, and type?

